ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2015
EXAMINATION CATEGORY: TECHNICAL

PAPER II: GENERAL SUBJECT KNOWLEDGE for *MEDICAL* GROUP

Date	**:** 10 October 2015
Total Marks	**:** 100
Examination Time	**:** 90 minutes (1.5 hours)
Reading Time	**:** 15 minutes (prior to examination time)

GENERAL INSTRUCTIONS

1. Write your Registration Number clearly and correctly in the Answer Booklet.
2. The first 15 minutes are to check the number of pages, printing errors, clarify doubts and to read the instructions in Question Paper. You are NOT permitted to write during this time.
3. This paper consists of **TWO Parts, namely Part I and Part II**.
   Part I consists of **70 Multiple Choice Questions** of 1 (one) mark each; and
   Part II consists of **10 Short Answer questions** of 3 (three) marks each.
4. **All questions are compulsory.**
5. All answers must be written in the Answer Booklet provided to you. You will not be given any marks for answers written other than in the Answer Booklet. Ask for additional Answer Booklet if required.
6. All answers should be written with correct numbering of Part, Section and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating any or correct Part, Section and Question Number will NOT be evaluated and no marks would be awarded.
7. Begin each Part in a fresh page of the Answer Booklet.
8. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
9. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. This paper has **13** printed pages in all, including this Instruction Page.

GOOD LUCK!

PART – I: MULTIPLE CHOICE QUESTIONS

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Sheet against the question number. E.g. 70 (a). Each question carries ONE mark.

1. Placenta and pericarp are both edible portions in:
   a) Apple
   b) Banana
   c) Tomato
   d) Potato

2. Example of the edible underground stem is:
   a) Carrot
   b) Groundnut
   c) Sweet potato
   d) Potato

3. The osmotic expansion of a cell kept in water is chiefly regulated by:
   a) Mitochondria
   b) Vacuoles
   c) Plastids
   d) Ribosome

4. Choose the spore forming bacteria:
   a) Mycobacterium tuberculosis
   b) Clostridium tetani
   c) Treponima palladium
   d) Vibrio cholerae

5. Which structures perform the function of mitochondria in bacteria?
   a) Nucleoid
   b) Ribosome
   c) Cell wall
   d) Mesosmes

6. In which of the following the CO2 is not released:
   a) Aerobic respiration
   b) Anaerobic respiration
   c) Alcoholic fermentation
   d) Lactate fermentation

7. Human female with Turner's syndrome has:
   a) Has 45 chromosomes with XO
   b) Has one additional X chromosomes
   c) Exhibits male characters
   d) Is able to produce normal children with husband

8. At which stage of HIV infection does one usually show symptoms of AIDS?
   a) Within 15 days of sexual contact with infected person
   b) When the infected retrovirus enters host cells
   c) When the viral DNA is produced by reverse transcriptase
   d) When HIV damages large numbers of helper T lymphocytes

9. 1st December is observed as:
   a) World's TB Day
   b) World's AIDs Day
   c) International Diabetic Day
   d) World's Cancer Day

10. Select the correct matching of the type of the joint with the example in human skeletal system versus type of joints:
   a) Cartilaginous joints ……between frontal and parietal
   b) Pivotal Joint……..between third and fourth cervical vertebrae
   c) Hinge Joint……between humorous and pectoral girdle
   d) Gliding joints……between carpals

11. Which of the following causes an increase in sodium reabsorption in the distal convoluted tubules?
   a) Increase in aldosterone levels
   b) Increase in antidiuretic hormones
   c) Decrease in aldosterone levels
   d) Decrease in antidiuretic hormones.

12. Total number of cranial nerves in Human is:
   a) 30
   b) 24
   c) 12
   d) 10

13. The target organ for vasopressin is:
   a) Liver
   b) Kidney
   c) Gonads
   d) Mammary glands

14. The bone of the knee cap is:
   a) Tibia
   b) Femur
   c) Fibula
   d) Patella

15. Osteoporosis is the disease of:
   a) Muscle
   b) Kidney

c) Heart
d) Bones

16. The lobe of the brain that has function for smell is:
a) Temporal
b) Frontal
c) Parietal
d) Occipital

17. The main function of the mammalian corpus luteum is to produce:
a) Estrogen only
b) Progesterone
c) Human chorionic gonadotropin
d) Relaxin only

18. Choose the correctly matching pair:
a) Inner lining of salivary ducts – Ciliated epithelium
b) Moist surface of buccal cavity –glandular epithelium
a) Tubular parts of nephrons-cuboidal epithelium
b) Inner surface of bronchioles- Squamous epithelium

19. In 'S' phase of the cell cycle:
a) Amount of DNA doubles in each cell
b) Amount of DNA remains same in each cell
c) Amount of DNA is reduced to half in each cell
d) Chromosome number is increased

20. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind?
a) 25%
b) 0%
c) 50%
d) 75%

21. How do parasympathetic neural signals affect the working of the heart?
a) Reduce both heart rate and cardiac output
b) Heart rate is increased without affecting the cardiac output
c) Both heart rate and cardiac output increase
d) Heart rate increases but cardiac output decreases

22. Person with blood group AB Positive is considered universal recipient of blood because he/she has:
a) Both A & B antigen on RBCs but no antibodies in the plasma
b) Both A and B antibodies in the plasma
c) No antigen on the RBCs and no antibodies in the plasma
d) Both A and B antigens in the plasma but no antibodies

23. Stimulation of muscle fiber by a motor neuron occurs at:
    a) Neuromuscular junction
    b) The transverse tubules
    c) The myofibril
    d) The sarcoplasmic reticulum

24. Which one of the following statement is not correct?
    a) Retina is the light absorbing portion of the visual photo pigments
    b) In retina the rods have the photo pigment rhodopsin while cones have three different photo pigments
    c) Retina is derivatives of vitamin C
    d) Rhodopsin is the purplish red protein present in rods only

25. A location with luxuriant growth of lichens on the trees indicates that the:
    a) trees are very healthy
    b) trees are heavily infested
    c) location is highly polluted
    d) location is clean without pollution

26. The zone of atmosphere in which the ozone layer is present is called:
    a) Ionosphere
    b) Mesosphere
    c) Stratosphere
    d) Troposphere

27. All the following category of white blood cells contains granules EXCEPT:
    a) Neutrophils
    b) Eosinophil
    c) Basophils
    d) Lymphocytes

28. Total number of deciduous teeth in humans is:
    a) 32
    b) 20
    c) 26
    d) 14

29. The ear ossicles of a mammal are arranged in one of the following orders starting from the tympanum in wards:
    a) Incus, Malleus, stapes,
    b) Stapes, incus, Malleus,
    c) Malleus, stapes, incus,
    d) Malleus, incus, stapes

30. Which statement is correct with reference to the circulation of blood in mammal?
    a) Venous blood is returned to the left auricle
    b) Pulmonary vein caries venous blood from the right auricle to the lungs

c) Pulmonary artery returns oxygenated blood from the lungs to the left auricle
d) Left auricle receives oxygenated blood from the lungs

31. All the following Electric devices and appliances need to convert DC to AC Except:
a) Laptop
b) X-Ray machine
c) Rice cooker
d) Laboratory Autoanalyzer

32. All the following are function of an earthing in electric supply EXCEPT:
a) Reduce the current flowing into the devices and appliances
b) Increase the voltage of the electric supply
c) To reduce the resistance for safety of human and animal life
d) Protection of building and installation against the lightening

33. All the following metals are used in the electric fuse to protect the devices, appliances and equipments from the overflow current EXCEPT:
a) Copper
b) Zinc
c) Lead
d) Silver

34. Choose the incorrect statement of difference between tube light and incandescent bulb in voltage consumption:
a) Tungsten bulb consumes more current due to generation of heat.
b) Tube light requires lower voltage than incandescent lamp.
c) Tube light uses electrode to produce heat, helium gas to produce light and phosphor powder to reflect the light.
d) There is no contact between two electrodes and starter is used to complete the circuit.

35. Two cells of 2.5V and 1.5V are connected in parallel the effective results of the voltage will be:
a) 1
b) 2
c) 3
d) 4

36. If a glass plate is placed between two charged bodies, the force between them will:
a) Increase
b) Decrease
c) Remain same
d) Be zero

37. A bird perched on the electric transmission wire doesn't get electrical shock because:
a) The avian blood is non conductor of electricity
b) Presence of insulated skin over the legs of the bird
c) Electric circuit is not completed for the flow of current through its body.
d) Feathers serve as insulation to the whole body of a bird.

38. The gaseous mixture used for laser surgery is:
    a) CO2, Nitrogen, helium
    b) Helium, Neon, argon
    c) Nitrogen, O2, CO2
    d) Neon, CO2, Nitrogen

39. The electromagnetic radiation with maximum wavelength is:
    a) Ultraviolet rays
    b) X-Rays
    c) Radio waves
    d) Infrared

40. Movement of colloidal substances under the influence of an electric current is known as:
    a) Electrophoresis
    b) Electro-osmosis
    c) Electro dialysis
    d) Brownian motion

41. The refractive index of the glass prism depends upon:
    a) The angle of prism
    b) The angle of deviation of light ray
    c) The colour of incident light
    d) The intensity of incident light

42. The energy which an electron acquires when accelerated through a potential difference of one volt is called:
    a) One joule
    b) One electron volt
    c) One erg
    d) One watt

43. A photon is:
    a) A quantum of radiation
    b) A quantum of matter
    c) Positively charged particles
    d) Negatively charge particle

44. When the speed of an electric fan increases, the current:
    a) Increases
    b) Decreases
    c) Remain same
    d) Becomes maximum when speed is maximum

45. During the lightening, it is advised to plug off all the electronic devices because:
    a) Electronic devices will be damaged due to increase voltage flow
    b) Electronic devices will be damaged due to increase in current flow
    c) Electronic devices will have current on their surface
    d) electronic devices will be heated up

46. 2.5 liters of a sodium chloride (NaCl) solution contains 5 moles of solute. What is its molarity?
    a) 5 molar
    b) 2 molar
    c) 2.5 Molar
    d) 12.5 Molar

47. Which of these functions is the least important for proteins?
    a) Become blood osmotic proteins
    b) Convert to enzymes
    c) Utilization for energy
    d) Component of structures

48. Choose the incorrect statement about the bilirubin:
    a) It is a yellow pigment produced by liver
    b) It is increased in patients with liver diseases
    c) It is undergoes photolysis when exposed to the light
    d) It is released by the breakdown of WBCs.

49. A polysaccharide which is often called animal starch is:
    a) Glycogen
    b) Starch
    c) Inulin
    d) Dextrin

50. The polysaccharide used in assessing the Glomerular filtration rate (GFR) is:
    a) Glycogen
    b) Agar
    c) Inulin
    d) Hyaluronic acid

51. The polysaccharide found in the exoskeleton of invertebrates is:
    a) Pectin
    b) Chitin
    c) Cellulose
    d) Chondroitin sulphate

52. Keratan sulphate is found in abundance in:
    a) Heart muscle
    b) Liver
    c) Adrenal cortex
    d) Cornea

53. Scientific name for Roundworm is:
    a) Wuchereria bancrofti
    b) Ascaris lubricoides
    c) Ancylostoma duodenalae
    d) Trichuris trichuria

54. Pork tapeworm infection is caused by:
    a) Ascaris lubricoides
    b) Ancylostoma duodenalae
    c) Taenia sagginita
    d) Tania solium

55. Phosphate is important for which of the following?
    a) Bone matrix
    b) ATP and energy reactions
    c) DNA and RNA
    d) All of these

56. Which ion is most important in oxygen transport?
    a) Iron
    b) Mg^{2+}
    c) Cl^{-}
    d) Iodine

57. Which of the following is not utilized for energy?
    a. Glucose
    b. Glycogen
    c. Ribose
    d. Galactose

58. Which tissue cannot store glycogen or lipids for energy?
    a. Nervous
    b. Skeletal muscle
    c. Liver
    d. Cardiac muscle

59. Compounds having the same structural formula but differing in spatial configuration are known as:
    a) Stereoisomers
    b) Anomers
    c) Optical isomers
    d) Epimer

60. The carbohydrate of the blood group substances is:
    a) Sucrose
    b) Frucose
    c) Arabinose
    d) Maltose

61. The sugar found in DNA is
    a) Xylose
    b) Ribose
    c) Deoxyribose
    d) Ribulose

62. The sugar found in milk is:
    a) Galactose
    b) Glucose
    c) Fructose
    d) Lactose

63. All the following are the disease of hypothyroidism due to insufficient production of thyroid hormones, T3 and T4 EXCEPT:
    a) Myxedema
    b) Cretinism
    c) Goiter
    d) Grave's disease

64. The addition of solid NaCl to a pure water causes:
    a) Decrease in pH
    b) Increase in pH
    c) No change in pH
    d) Complete dissociation of NaCl

65. The Choose the most effective disinfectants for use as decontaminating agent:
    a) Detol
    b) Savlon
    c) Bleaching poweder
    d) 70% alcohol

66. Choose the correct colour code in sequence of the category of medical wastes for segregation:

a)	Infectious-non Infectious-Sharps	Green-Red-Yellow
b)	Sharps-infectious-non infectious	Red-Green-Yellow
c)	Sharps-infectious-non infectious	Red-Green-Yellow
d)	Non Infectious-Infectious-Sharps	Green-Red-Yellow

67. Chili is popularly eaten by Bhutanese in different form of dishes despite being too hot. The chemical responsible for the hotness of chilli is:
    a) Formic acid
    b) Citric acid
    c) Abscisic Acid.
    d) Capsaicin

68. When two palms are rubbed together for a while, a heat is generated:
    a) Due to the collision of electrons and protons on the palms
    b) Due to the radiation of energy by the moving electrons
    c) Due to the radiation of energy by the moving protons
    d) Due to the collision of electrons

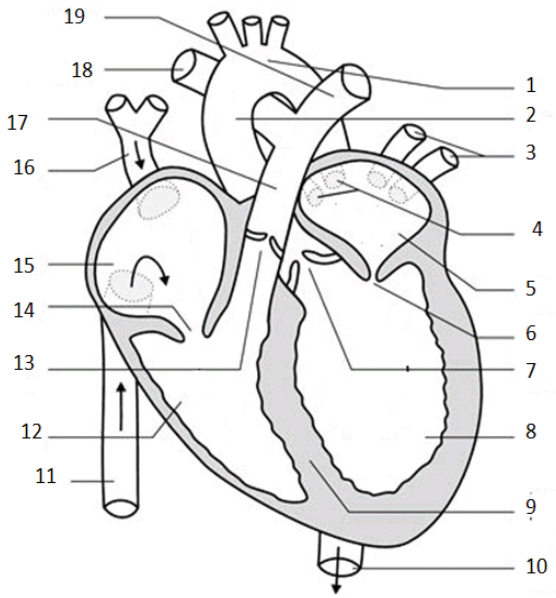
69. Place a dried grape for a period of one hour in a container containing tape water. What would your observation be:
    a) There won't' be any change to the dried grape
    b) Grape increases the size because water enters the grape by osmosis
    c) Grape shrinks because of the exosmosis of water from the grape
    d) Grape shrinks because of endosmosis

70. What does an object have when moving, that it never has when at rest?
    a. Momentum
    b. Mass
    c. Energy
    d. Inertia

PART II: SHORT ANSWER QUESTIONS

Answer all questions. Each question carries THREE marks.

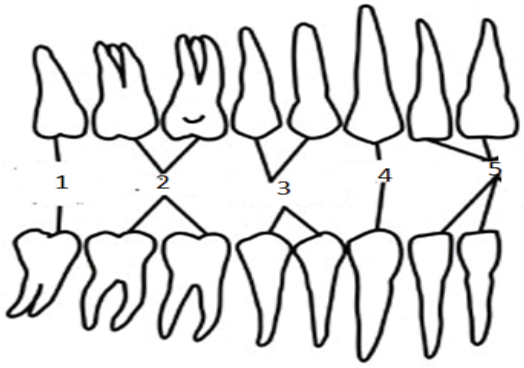
1. Label the diagram of the parts of human heart (No. 1-19) and complete the direction of the blood flow indicated by the arrows to the lungs and from the lungs to the upper and lower part of the body.



2. Write down the differences between DNA and RNA in terms of location, structure, compositions and functions.

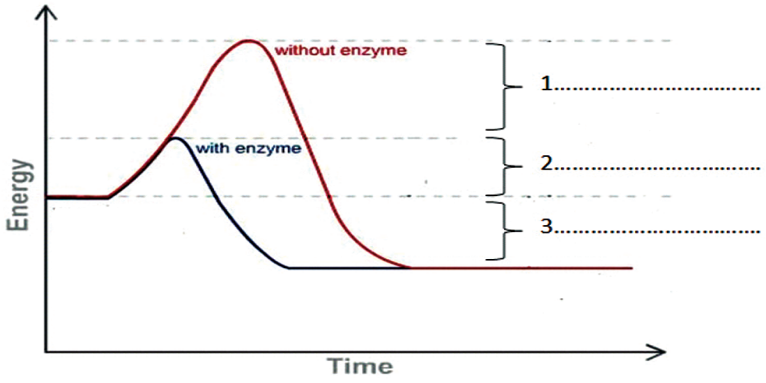
3. Classify the proteins based on solubility and structure and give one example each.

4. There are 5 different types of human teeth as shown in the diagram. Name the teeth (1-5) and explain the function of each tooth.

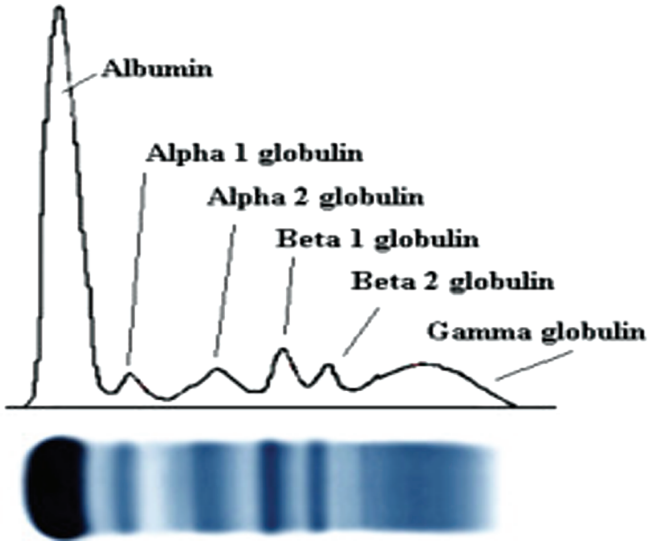


5. How does smoking tobacco in human, leads to reduction of oxygen concentration in the body?

6. Following graph shows a catalytic action of an enzyme on a substrate. Label the graph number 1-3 and explain the catalytic action of the enzymes with the help of this graph.



7. Answer the following questions using the diagram of the protein separation bellow:
   a) Name term and explain the principle of protein separation?
   b) Why does albumin show highest peak among all the proteins?



8. Explain the Principle of hydroelectric power generation

9. Describe menstrual cycle of the human female

10. Explain green house effect